Generation of Cre-transgenic mice using Dlx1/Dlx2 enhancers and their characterization in GABAergic interneurons.

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Public Summary:

Scientific Abstract:
DLX1 and DLX2 transcription factors are necessary for forebrain GABAergic neuron differentiation, migration, and survival. We generated transgenic mice that express Cre-recombinase under the control of two ultra-conserved DNA elements near the Dlx1 and 2 locus termed I12b and URE2. We show that Cre-recombinase is active in a "Dlx-pattern" in the embryonic forebrain of transgenic mice. I12b-Cre is more active than URE2-Cre in the medial ganglionic eminences and its derivatives. Fate-mapping of EGFP+ cells in adult Cre;Z/EG animals demonstrated that GABAergic neurons, but not glia, are labeled. Most NPY+, nNOS+, parvalbumin+, and somatostatin+ cells are marked by I12b-Cre in the cortex and hippocampus, while 25-40% of these interneuron subtypes are labeled by URE2-Cre. Labeling of neurons generated between E12.5 to E15.5 indicated differences in birth-dates of EGFP+ cells that populate the olfactory bulb, hippocampus, and cortex. Finally, we provide the first in vivo evidence that both I12b and URE2 are direct targets of DLX2 and require Dlx1 and Dlx2 expression for proper activity.

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